

Measuring made Easy:
OR THE
Description and Use of
COGGESHALL's
SLIDING RULE,

CONTAINING

Instructions for Measuring all manner
of Timber, both by the Common Way,
and the True Way. With Directions for
taking the Dimensions of Trees, and the
Allowance for Bark, &c. Performed
both by the Rule, and by Arithmetick.

By which may be Measured all man-
ner of Superficies, as Board, Glass,
Plastering, Painting, Winscoting, Tyleing,
Paveing, Land, both by the Rule and
Arithmetick.

By J. GOOD, Teacher of the Mathematicks.
Carefully Corrected, and much Enlarged
by J. Atkinson, & n.

London, Printed for R. and W. Mount, and
T. Page, at the Postern on Tower-hill. 1719.

*will give y^e content in square Inches, w^{ch} being
divided 1728 gives y^e content in feet.*

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TO THE
READER.

I Here present you with some Fruits of my spare Hours, wherein I have endeavoured to render the Use of the Sliding-Rule more Plain and Easy than ever it appeared before.

I have here delivered in a few Rules, but yet in a Plain and Easy Manner, Problems for the Measuring all Manner of Regular Figures, and Plain Superficies, such as Board, Glafs, Painting, Plastering, Paveing, Tyleing, Joyners, and Mafons Works, &c. and that both by the Sliding-Rule and by Arithmetick.

In the next place you have Directions for the Measuring all manner of Timber, or Stone by the Sliding-Rule, and Arithmetically, by a New Method, whereby the True Content of Round Timber, or Trees may be found.

I remain a Well-wisher to the Mathematicks,

JOHN GOOD.

C H A P. I.

The Description and Use of
Coggeshall's R U L E.

THis Rule is fram'd three ways ;
Sliding by one another, like *Glaiser's-Rules* ; *Sliding* on one side
 of a *Two Foot Joint-Rule* ; and one part
Sliding on the other, in a Foot long ; the
 back part being flat, on which are *Sundry*
Lines or *Scales*.

Upon the foresaid *Sliding side* of the
Rule, are *Four Lines of Numbers*, three
 are *Double Lines*, and One a *Single Line*
 of *Numbers* ; marked in the *Figure* annexed,
 with A, B, C, and D.

The three marked A, B, and C, are cal-
 led *Double Lines of Numbers* ; being figur'd
 1, 2, 3, 4, 5, 6, 7, 8, 9. Ther, 1, 2, 3,
 4, 5, 6, 7, 8, 9, and 10 at the End.

That Marked D, is the *Single Line of*
Numbers, and Figur'd thus, 4, 5, 6, 7, 8,
 9, 10, 20, 30, and 40 at the End even
 with and under 10 in the *Double Line* next
 to it, this is call'd the *Gert-Line*, and is
 so marked in the *Figure*. The

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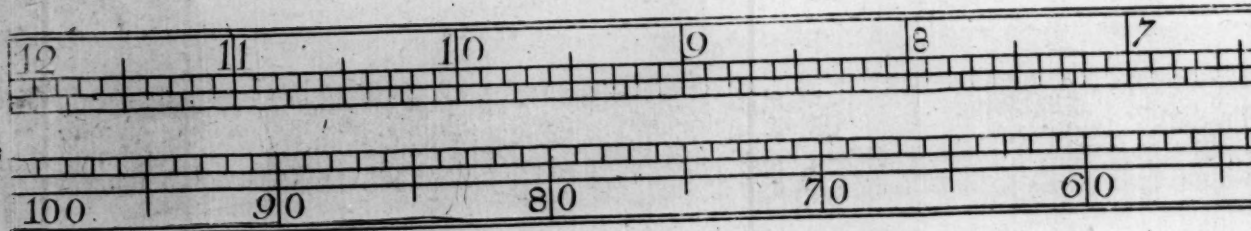
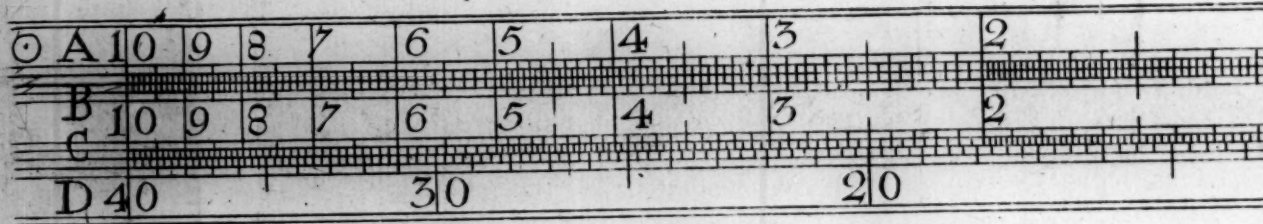
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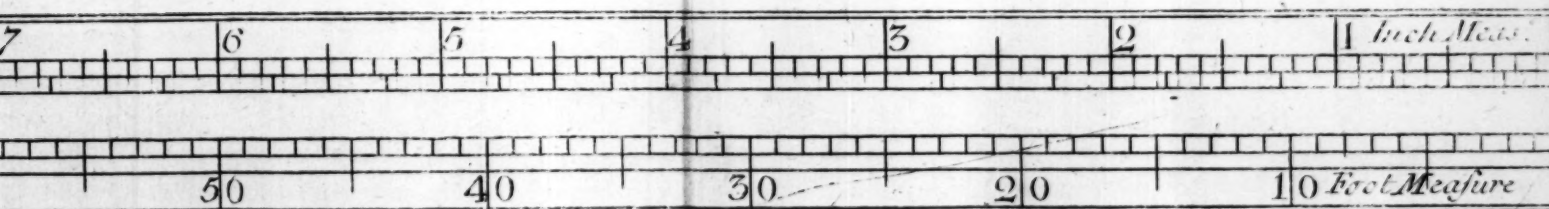
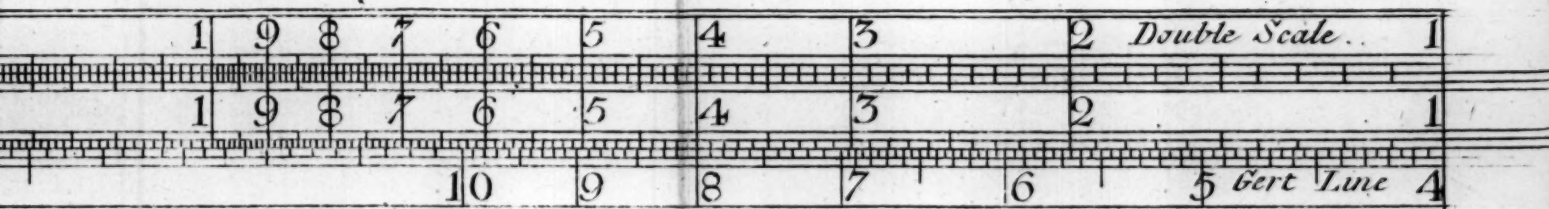
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Shall's Rule for Menfuration



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The Figures on the *Three Double Lines of Numbers* may be increased or decreased at pleasure ; thus, 1 at the beginning may be call'd 10, 100, or 1000, then 2 is 20, 200, or 2000 ; so that when 1 at the beginning is 10, then 1 in the middle is 100, and then 10 at the End is 1000 ; but if 1 at the beginning is counted for 1, then 1 in the Middle is 10, and then 10 at the End is 100.

And as the Figures are alter'd, so must the Stroaks or Divisions between them be alter'd in their value according to the Number of the parts they are divided into : As thus, from 1 to 2 it's divided into 10 parts, and each *Tenth*, is divided into 5 parts, and from 2 to 3, it's divided into 10 parts, and each *Tenth* into 2 parts, and so on from 3 to 5 ; then from 5 to 6, it's divided into 10 parts only ; and so on unto 1 in the Middle of the *Rule*, or the First Part of the *Double Line of Numbers*. The *Second Part*, or *Radius*, is divided like the *First Radius*.

The *Gert-Line* mark'd D, is divided from 4 to 5 into 10 parts, and each *Tenth* into 2 parts, and so on from 5 to 10, then from 10 to 20, it's divided into 10 parts, and each *Tenth* is divided into 4 parts ; and so on all the way from 20 to 40 at

the *End*, which is right against 10 at the *End* of the *Double Line of Numbers*.

The *Lines* on the Backside of this Rule that slides on one Side, are these, a *Line of Inch Measure* from 1 to 12, each *Inch* Divided into *Halves*, *Quarters*, and *Half-Quarters*; another *Line of Inch Measure* from 1 to 12, each *Inch* Divided into 10 *Equal parts*; and a *Line of Foot-Measure* being one *Foot* Divided into 100 *Equal parts*, and Figur'd 10, 20, 30, 40, 50, 60, 70, 80, 90, and 100 even with 12 on *Inch Measure*.

And the *Back-Side* of the *Sliding-Piece* is Divided into *Inches*, *Halves*, *Quarters*, and *Half-Quarters*, and Figur'd from 12 to 24; so that it may be slid out to 2 *Foot*, to measure the Length of a Tree, or any thing else you have occasion to measure.

Note. The *Line of Foot-Measure* turns *Inches*, *Halves*, *Quarters*, &c. into *Decimal-parts of a Foot*, which is most ready for *Measuring* by this Rule, as also by *Arithmetick*; And it's made fully out in the Table following.

A TABLE Reducing Inches, Halves, Quarters, and Half-Quarters, into Decimal Parts of a Foot: Or, Reducing Inch-Measure into Foot-Measure.

Inches.	Deci- mal	Parts of an Inch.						
		$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$
0	.000	.010	.021	.031	.042	.052	.062	.073
1	.083	.094	104	115	125	135	146	156
2	.167	.177	188	198	208	219	229	24
3	.25	.26	271	281	292	302	313	323
4	.333	.344	354	365	375	385	396	406
5	.417	.427	428	448	458	469	479	49
6	.5	.51	521	531	542	552	569	573
7	.583	.594	604	615	625	635	646	656
8	.667	.677	688	698	708	719	729	74
9	.75	.76	771	781	792	802	813	823
10	.833	.844	854	865	875	885	896	906
11	.917	.927	937	948	958	969	979	99

By this Table $\frac{1}{8}$ or Half Quarter of an Inch in Foot-Measure, or Decimals, is .01, or $\frac{1}{100}$ part of a Foot; $\frac{1}{4}$ of an Inch is .021, or shorter .02, that is $\frac{2}{100}$ parts of a Foot; and so on in the upper Line of the Table. And in the next Line under it, 1 Inch is

.083 or $\frac{8}{100}$ of a Foot; Inch $1\frac{1}{8}$ is .094 or $\frac{9}{100}$; Inch $1\frac{1}{4}$ is .104 or $\frac{1}{10}$, Inch $1\frac{3}{8}$ is .115, or $\frac{11}{100}$ of a Foot, and so on: And in the first Column under Decimals 1 Inch .083; 2 Inches .167; 3 Inches is .25; 4 Inches .333; and so on to 11 Inches is .917 or $\frac{9}{10}$. All these may be found on the Line of Foot-Measure on the Backside of the Rule.

C H A P. II.

The Use of the Double Scale, shewing how to find the Area of any Plain Surfaces; and also Arithmetically.

Prob. I. To measure a Geometrical Square.

B^y the *Sliding-Rule*. Let there be a Square whose Sides are each three Feet and a half. Set 1 on the Line B, to 3 and $\frac{1}{2}$ on the Line A, then against $3\frac{1}{2}$ on the Line B, is 12 Feet $\frac{1}{4}$ on the Line A, which is the Content of such a Square.

1	2	3	a
4	5	6	b
7	8	9	f
c	d	e	g

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1

Note. The Figure it self shews the Content in Feet by Inspection, for if you tell the greater Squares, you see they are 9 in number; *a* and *b*, makes 10; *c* and *d*, makes 11; *e* and *f*, makes 12; and the little Square *g* in the Corner, makes one quarter of a Foot, which is in all 12 Feet and a quarter.

More Examples by the Rule.

Length of the side $5\frac{1}{4}$ Feet } 27 Feet and a half
 Length of the side $7\frac{1}{2}$ Feet } 56 Feet and a quart
 Length of the side $10\frac{3}{4}$ Feet } 115 Feet and a half.
 Length of the side 13 Feet } 169 Feet.

PROB.

PROB. II. *To measure a Long Square by the Sliding-Rule; and also by Arithmetick.*

LET there be a *Long Square*, whose longest side is *27 feet and a half*, and the shortest *16 feet and a quarter*; set **1.** on the *line B*, to $16\frac{1}{4}$ on the *line A*, then against $27\frac{1}{2}$, on the *line B*, is *446 feet $\frac{3}{4}$* , the *Content* of the *Long Square*, on the *line A*.

By Decimal Arithmetick.

✂ Multiply the *Length* by the *Breadth*, and from the *Product* cut off as many *Places* to the *Right-hand* as there are *Decimals in the Length and Breadth*; the *Integers* remaining to the *Left hand* are the *square Feet*.

Example.

Length Feet, $27\frac{1}{2}$ or ——— *F.Par.* 27. 50

Breadth Feet, $16\frac{1}{4}$ or ——— 16. 25

$\frac{1}{4}$	$27\frac{1}{2}$
26	Area. 446.f

13750

5500

16500

2750

446.8750

But

But Contracted thus.

F.Par

Breadth Feet $16\frac{1}{4}$ or in Decimals — 16.25

Length Feet $27\frac{1}{4}$ or 27.25 Inverted is 5.72

3250

1137

81

The *Product* is the *Content* req. Feet 446.8

In this *Contracted* way, Multiply each *Figure* of the *Inverted* Number (beginning at the Right-hand) by the Figure over it, and putting the several *Multiplications* even at the Right-hand, as above: Thus, multiplying by 2, the *Product* is 3250: Then say 7 times 5 is 35, leave out 5 and carry 3 in your mind, then saying 7 times 2 is 14 and 3 I carried, makes 17, set 7 just under the 0, and carry the 1 in your mind; saying 7 times 6 is 42, and 1 I carried makes 43, set 3 under 5 and carry the 4 in your mind; and so on to the end of that line: Then say 5 times 2 is 10, reject the 0, and carry 1 in your mind; then say 5 times 6 is 30, and 1 I carried makes 31, set 1 just under the 7, and carry the 3 in your mind; Saying 5 times 1 is 5, and 3 I carried makes 8, setting it under the 3, and *Multiplying* is done: Then add them together and it's 446.8; that is, Feet $446\frac{8}{10}$ or 446 Feet $\frac{2}{5}$ as before.

Note

Note. Where the *Units place* of the *Inverted Number* stands, so many places are to be cut off in the *Product*: As in this *Example*, 7 the *Units place*, when *Inverted* stands under 2, the *First Place in Decimals*, and therefore one place must be cut off in the *Product*, at the *Right-hand*; so that the *Product* 4468 must be 446.8 or $446\frac{8}{10}$. Observe the like in all that follows.

More Examples by the Sliding Rule.

		Contents.
Breadth $11\frac{1}{4} F$	} Length $15\frac{1}{2}$	} 174 F and $\frac{7}{4}$
Breadth $17\frac{1}{2} F$		
Breadth $22\frac{3}{4} F$		
	} Length $21\frac{1}{4}$	} 371 $F\frac{3}{4}$
	} Length $29\frac{3}{4}$	} 676 $F\frac{3}{4}$

P R O B III. *How to measure a Rhombus by the Sliding-Rule.*

Suppose the *Side* of a *Rhombus* be 8 Feet 6 Inches and a quarter, and the *Breadth*, or *Line A B*, 8 Feet 4 Inches and a half: That is the *Length* is Feet $8\frac{3}{4}$, and *Breadth* is Feet $8\frac{1}{2}$. Then set 1 on the *line B*, to 8 Feet $\frac{3}{4}$ on the *line A*; then against 8 Feet $\frac{1}{2}$ on the *line B*, is 71 Feet $\frac{4}{10}$ parts of a Foot on the *line A*; now if you would find the *Value* of the *Decimal*, or part of the *Foot*, look for $\frac{4}{10}$ on your *Rule*, and you will find against it 4 Inches $\frac{3}{4}$. so that the *Content* of this *Rhombus* is 71 Feet 4 Inches $\frac{3}{4}$.
By

By Decimal Arithmetick.

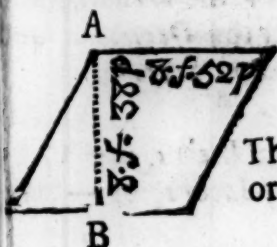
Multiply the *breadth* AB, by the *length* of any of the Sides, and from the *Product* cut off as many Places to the Right-hand as are *Decimals* in the *length* and *breadth*, the *Integers* remaining to the Left-hand are the *square-Feet* requir'd.

Example.

F.Par.

The Length Feet 8.06 Inches $\frac{1}{4}$ or 8.52

Breadth AB Feet 8.04 Inches $\frac{1}{2}$ or 8.38



6816
2556
6816

The Cont. is Feet. 71.3976
or 71 Feet 4 Inches $\frac{1}{4}$

And Contracted is thus,

F.Par

Length Feet 8.06 Inches $8\frac{1}{4}$ is in Dec. 8.52

Breadth AB, Feet 8.04 Inches and $\frac{1}{2}$ is 8.38 Inverted is } 83.8

6816
255
68

The Cont. Requir'd as before is Feet 71.39

PROB

P R O B. IV. *How to measure a Rhomboide by the Sliding-Rule.*

Admit the length of a *Rhomboide* be 17 Feet 3 Inches, or $17\frac{3}{4}$, and the true breadth 8 Feet 7 Inches, or $8\frac{7}{8}$, what is the *Content*? Set 1 on the line B, to 17.25 on the line A; then against 8.58 on the line B, is 148 Feet on the line A.

By Decimal Arithmetick.

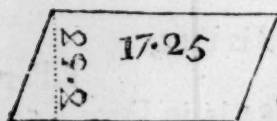
Multiply the *length* by the *breadth*, and from the *Product* cut off the *Decimals*, and the *Remainder* is the *square Feet*.

Example.

F.Par

The Length 17 Feet 3 Inches, or — 17.25

The Breadth 8 Feet 7 Inches, or — 8.58



13800

8625

13830

The Cont. is F. 148.3050
or 148 Feet.

By Contradition thus,

F.Par

Length 17 Feet 3 Inch. in Decimals — 17.25

Breadth 8 F. 7 Inch. or 8.58 Inverted is — 8.58

13800

862

138

The *Content* as before is — Feet 148.00

P R O B.

PROB. V. *How to measure a Triangle by the Sliding-Rule.*

Theorem. Every Triangle is half of that Long-square whose Length and Breadth is equal to the Perpendicular and Base. Therefore from the greatest Angle let fall a line Perpendicular, to the side (opposite to the greatest Angle) called the Base: Therefore to find the Content of any Triangle, take half the length of the Base and the whole Perpendicular; or half the length of the Perpendicular, and the whole Base.

Example:

Let the Base of a Triangle be 4 Feet $\frac{1}{2}$ or 4 Feet 1 Inch $\frac{1}{2}$, and the Perpendicular 2 Feet $\frac{1}{2}$ or 2 Feet 1 Inch $\frac{1}{2}$, the half of the one is 2 Feet 7 parts, and the half of the other is 1 Foot 7 parts; set 1 on the line B, to 4.15 on the line A, then against 1.07, half the Perpendicular on the line B, is 4 Feet and almost a half, for the Content. Or if you set 1 on the line B, to 1.07 on the line A; against 4.15 on the line B, is 4 and almost a half, on the line A. Again another way, if you set 1 on the line B, to 4.1 on the line A; then against 2.15 on the line B, is 8 Feet $\frac{1}{2}$ (which is about 11 Inches) on the line A, the half thereof is 4 Feet 5 In. $\frac{1}{2}$, which is the Content of the Triangle.

By

By Decimal Arithmetick all the 3 ways,
F. Pat

1 Way. $\left\{ \begin{array}{l} \text{The whole Base is } \text{---} 4.15 \\ \text{The } \frac{1}{2} \text{ Perpendicular is } \text{---} 1.07 \end{array} \right.$

$$\begin{array}{r} 2905 \\ 415 \\ \hline \end{array}$$

The Content 4 Feet 5 Inches $\frac{1}{2}$ Feet $\underline{4.4405}$

2d Way. $\left\{ \begin{array}{l} \text{The whole Perpendicular } 2.15 \\ \text{The halfe Base } \text{---} \text{---} 2.07 \end{array} \right.$

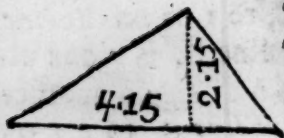
$$\begin{array}{r} 1505 \\ 430 \\ \hline \end{array}$$

The Content 4 Feet 5 Inches $\frac{1}{2}$ or Feet $\underline{4.4505}$

3d Way. $\left\{ \begin{array}{l} \text{The whole Base } \text{---} \text{---} 4.15 \\ \text{The whole Perpendicular } 2.15 \end{array} \right.$

$$\begin{array}{r} 2075 \\ 415 \\ 820 \\ \hline \end{array}$$

The Product is Feet 8.9225
The half is Feet 4.4612
The Content is 4 Feet 5
Inches and $\frac{1}{2}$, as before.



By

By Contradiction thus,

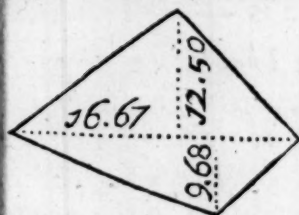
F. Pat

The whole Base ————— 4 15
 Whole Perpendicular 2.15 Inverted is — 51.2
 830
 41
 21

The Product is ————— 8 92
 Half is the Content 4 F. 5 In $\frac{1}{2}$ as before 4.46

P R O B. VI. Of the Measuring a Trapezium.

A Trapezium, is a Figure of 4 Sides ; but is not a Square, a long Square, a Rhombus, nor a Rhomboide ; which before it can be measured must be divided into Triangles, by a line from one Corner to his opposite one, through the Trapezium ; so will the two Perpendiculars fall from the other two Angles upon this Diagonal, or Cross-line ; then the Content of the Figures are to be found by the last Problem.



Example, Suppose the Demenensions of a Trapezium were as followeth, the Base is 16 Feet, 8 Inches, the one Perpendicular 12 Feet 6 Inches, and

the other 9 Feet 8 Inches, what is the Content ?

B

Deci-

Decimally.

	F.Par
One Perpendicular 12 Feet 6 Inch. or	12.50
The other 9 Feet 8 Inches, or	9.68
The Sum is	22.18
The $\frac{1}{2}$ Sum is	11.09
Multiplied by the whole Base	16.67
	7763
	6654
	6654
	1109

The Content 184 F. 10 In. $\frac{1}{2}$ or feet 184.8703

By Contraction thus.

	F.Par
Sum of the two Perpen. 11 F. 1 In. or	11.08
Base 16 F. 8 Inch. or 16.67 Inverted is	76.61
	1108
	665
	67
	8

The Content as before is ——— Feet 184.8

Note. If 2 sides of a Trapezium are parallel, add them together, and half the Sum, this half Sum multiplied by the nearest Distance betwixt those 2 sides, the Product gives the Content. Or if you measure it in the middle betwixt those two lines, that are parallel, it will be the same.

PROB.

PROB. VII. *To measure any Regular Figure.*

OF these *Regular-Figures* there are several sorts, as the *Pentagon*, contained under 5 *sides*; the *Hexagon*, contained under 6 *sides*; the *Heptagon*, contained under 7 *sides*; and the *Octogon*, contained under 8 *sides*, &c.

Now to measure any of these sorts of *Figures* practically, it is by dividing them into *Triangles*, which is done by drawing lines from the *Center* of the *Figure* to every *Angle*, then from the *Center* to the middle of any one of the *Triangles sides*, draw a line, which line is the *Perpendicular*. Having the *Perpendicular* and *Base* of any of these *Triangles* (by Prob. 5.) find the *Content* of one *Triangle*, and that multiplied by the number of *Triangles*, finds the *Content* of the *Figure*.

Note, To find the *Center* of any *Regular Figure*, of even Number of *sides*, draw a line from one *Angle* to its opposite, the middle of which is the *Center*; but if your *Figure* have any odd Number of *sides*, as 5, or 7, &c. draw a line from any *Angle* to the middle of the *side* opposite, the middle of which line is the *Center*.

CHAP. III. *The Use of the Girt-line, and line of Numbers called the Double-scale, in measuring of Circles and their Parts.*

Prob. I. **L** Et the Diameter of a Circle be feet $\frac{2}{1} \frac{5}{8}$, to find the Content set 11 on the Girt-line D, to 95 on the Double line C; then against 2 feet $\frac{1}{1} \frac{5}{8}$ on C the Girt-line, is 3 feet $\frac{2}{1} \frac{5}{8}$ on the Double-scale of Numbers D, which is the Content.

Arithmetically.

The Rule. Multiply the Diameter in Inches by it self, and then by this fixt Number .7854, and from the Product cut off from the Right-hand four Figures, the Remainder to the Left-hand is the Content of the Circle in Inches, which divided by 144, gives the Feet, and the Remainder, if any, divide by 12, gives the Inches.

Examp. The Fixt Number ——— 7854

The Diameter multiplied ——— 729 Inches

70686

The Diameter 27 Inches 15708

The Diameter 27 Inches 54978 F. In.

189

144)573.5566(3.11.

54

432

Dia. Multipl'd 729 Inch. 12)141

12

021

012

09

The Content 3 foot 11 Inches $\frac{3}{4}$

The

The Rule may be thus. Multiply the Diameter in Foot-Measure by it Self, the Product is call'd the Square of the Diameter, then Multiply by the first Number 0.7854 in the Contracted way, and this last Product is the Content Requir'd, as follows. F.Par

The Diameter 2 Feet $\frac{2}{1}$ or ——— 2.25

The Diameter 2 Feet $\frac{2}{100}$ Inverted is 52.2

450

45

11

The Square of the Diameter is Feet — 5.06

The first Number 0.7854 Inverted is 4587

3542

405

25

2

Content 3 F. 11 Inch. $\frac{3}{4}$ almost, or Feet 3.974

PROB. II. To find the Content of a Semicircle.

BY having the Diameter by the last Problem, find the Content of the whole Circle, the half thereof is the Content of the Semicircle. I think this needs no Example.

PROB. III. To find the Content of a Quarter of a Circle, commonly called a Quadrant.

Example. **T** Here is a Quadrant, whose Semidiameter is 7 feet, and

the Circuit of the Arch is 11 Feet, what is the Content? Set 1 on the *Double line* B, to 7 the *Semidiameter* on the *Double line* A, then against 5 feet $\frac{1}{160}$ (which is *half the Circuit of the Arch*), on B, is $38\frac{1}{2}$ on A the Content, 38 Feet 6 Inches, or $38\frac{1}{2}$.

PROB. IV. *To find the Content of a Sector of a Circle.*

The Rule. Set 1 on the *Double-line*, to the *Semidiameter* on the *Double-line*, then against *half the Circuit of the Arch* on the *Double-line*, is the Content on the other *Double-line*. This needs no Example.

PROB. V. *How to measure the Segment of a Circle.*

A Segment of a Circle, is a strait Line drawn thro' the Circle, but not thro' the Center, it divides a Circle into 2 Parts or Segments; and the lesser is thus measured. Let the Sector be measured, whereof the Segment is part, then subtract the Triangular Part, the Remainder is the Content of the Segment: But to the greater Segment, the Content of the Triangle included is to be added.

C H A P. IV.

The Use of the Double-Scale ; shewing how to measure all manner of Superficies, as Board, Glass, Painting, Plaistering, Wainscoting, Tyleing, Paving, &c. by the Sliding-Rule, and Arithmetically.

I. In Measuring Boards.

PROB. I. Let there be a Board whose Breadth is 27 Inches $\frac{1}{2}$, or $27\frac{1}{2}$, and the Length 15 foot $\frac{1}{4}$, or $15\frac{1}{4}$, what is the Content by the Sliding-Rule.

Example.

Set 12 on the Double Scale B, to $27\frac{1}{2}$ on the Double-Scale A; then against 15 feet $\frac{1}{4}$ on the Double-Scale B, is 35 feet the Content on the Double-Scale A.

Decimally.

The Rule. Multiply the length in feet by the breadth in Inches, and cut off so many Figures from the Right-hand, as are Decimals in your length and breadth, the Remainder divided by 12, the Quotient is the feet and the Remainder (if any) the odd Inches.

B 4

Exam-

Example. Length is ——— Feet-15 25

Breadth is ——— Inches-27.50

$$\begin{array}{r}
 76250 \\
 10675 \\
 \hline
 3050 \quad \text{F. In} \\
 12)4193750(34.11 \\
 \underline{36} \\
 059
 \end{array}$$

The *Cont.* is 34 F. 11 Inch-48

11 Inches

The length 15 Feet $\frac{1}{2}$ or ——— Feet-15.25

Breadth 27 In. $\frac{1}{2}$ or 27.5 Inverted is —5.72

$$\begin{array}{r}
 3050 \\
 1068 \\
 \hline
 76
 \end{array}$$

Product is 419 In. $\frac{4}{5}$ as before Inches 419.4
 But if the *Breadth* be taken in *Foot-Measure*, it's done without *Division* as follows.

F. Par

The length as before 15 Feet $\frac{1}{4}$ or —15.25

Breadth 27 Inch. $\frac{1}{4}$ or 2 F. $\frac{3}{4}$ Inverted 92.2

$$\begin{array}{r}
 3050 \\
 305 \\
 \hline
 137
 \end{array}$$

Content is 34 F. 11 I. as before, or F. 34.92

And by the *Sliding-Rule* it's thus: Set 1
 on the *Double-Scale B*, to 2.29 on the *Double*
 ble

le Scale A ; then against 15.25 on the Double Scale B, is almost 35 feet on the Double-Scale A, the Content as before.

Or, by the Rule of Practice, when the Length is in Feet and Inches, and the Breadth also in the same ; counting for 1 Foot in Breadth, the whole Length is the Content, and for the Inches ; according to its Aliquot parts of a Foot or 12 Inches ; as it follows, in the last Example.

A Board whose Length being 15 Feet 3 Inches, and Breadth 27 Inches $\frac{1}{2}$ or 2 Feet 3 Inches $\frac{1}{2}$. F. Inc.

The Length ————— 15.03

Set it down again ————— 15.03

Divide by 4, because 3 In. is $\frac{1}{4}$ of a Foot—3.09 $\frac{3}{4}$

Div. the last by 6, bec. $\frac{1}{2}$ In. is $\frac{1}{6}$ of 3 In.—0.07 $\frac{3}{4}$

And all together is the Cont. Req.—34.11 $\frac{1}{2}$

In like manner the Examples following may be done, both by the Foot-Measure, and by this Rule of Practice, which is worth the Learner's minding.

More Examples.

The Breadth 9 In.	} Length 13 F.	{	Con. 9 F.	$\frac{3}{4}$	
The Breadth 21 In.			Length 19 F.	Con. 33 F.	$\frac{1}{4}$
The Breadth 25 In.			Length 29 $\frac{1}{2}$ F.	Con. 61 F.	$\frac{1}{2}$

P R O B. II. *Another Way when the Dimensions are Feet and parts, and the Content is required in Feet and parts, by the Sliding-Rule.* Let

Let there be a Board whose Length is 24 Feet $\frac{3}{4}$, and the Breadth 1 Foot $\frac{1}{2}$, what is the Content? *Example.*

Set 1 on the Double Scale B, to 1 $\frac{1}{2}$ on the Double-Scale A; then against 24 $\frac{3}{4}$ on the Double-Scale B, is 37 Feet $\frac{1}{2}$ on the Double-Scale A, which is the Content.

More Examples.

Breadth	3 $\frac{1}{4}$ feet	} Length	20 feet	} 65 feet	
Breadth	7 $\frac{1}{2}$ feet		25 feet		187 feet $\frac{1}{2}$
Breadth	12 feet		30 feet		360 feet
Breadth	15 feet		35 feet		525 feet

How to work this second Problem Decimally, as is taught Chap. 2. Prob. 2.

Example. F.Par.

Length ————— 24.75
Breadth ————— 1.50

123750

2475

Cont. is 37 F. $\frac{1}{2}$ or 1 Inch $\frac{1}{2}$ or Feet 37.1250
And by *Contraction* thus, the said *Example*.

F.Par.

Length 24 feet $\frac{3}{4}$, or ————— 24.75
Breadth 1 Foot $\frac{1}{2}$, or 1.5 Inverted is 5.1

2475

1237

The Content 37 Feet 1 Inch $\frac{1}{2}$, or Feet 37.12

Ex-

Examples Decimally Contrasted.

Breadth 4.27	Leng. 06.21	$26\frac{1}{2}$ or 26 f. 6 In
Breadth 8.46	Leng. 11.32	$95\frac{1}{2}$ or 95 f. 9 In
Breadth 12.54	Leng. 15.35	$192\frac{1}{2}$ or 192 f. 5 In
Breadth 16.74	Leng. 21.42	$358\frac{1}{2}$ or 358 f. 6 In

PROB. III. *Directions for the Measuring of most Sorts of Artificers Works, and first of Glasiers Work, with the manner of taking their Dimensions.*

THE best way to measure *Glasiers Work* is by the *Sliding Rule*, and the *Dimensions* are taken very exact, even to $\frac{1}{4}$ of an Inch; they commonly agree for their Work by the Foot; whether the *Glass* be Old or New, *Squares* or *Quarries*. Note, *Sash-Windows* are glazed by the *Square*; that is, they tell how many *Squares* there be in all the *Lights*, and then reckon what they come to at so much the *Score*, or *Dozen*

PROB. IV.

Let there be a Pane of Glass 29 $\frac{1}{2}$ Inches long, and 7 Inches broad; what is the Content?

Example.

By the Sliding Rule, set 144 (represented by 1.44) on the Line B, to 7 Inches on the Line A, then against 29 $\frac{1}{2}$ on the Line B, is 1 foot and almost a half on the Line A, or Decimally 1 foot $\frac{4}{5}$

More

More Examples:

Breadth $3\frac{1}{2}$ In	Length $20\frac{1}{4}$ In	49 parts, or 5 In. $\frac{7}{8}$
Breadth $5\frac{1}{4}$ In	Length $25\frac{1}{2}$ In	92 parts, or 11 In. $\frac{1}{4}$
Breadth $9\frac{3}{4}$ In	Length $30\frac{3}{4}$ In	2 feet 1 Inch. $\frac{1}{4}$
Breadth $13\frac{1}{4}$ In	Length 35 Inch	3 feet 2 Inch. $\frac{3}{4}$

The foregoing Problem Arithmetically.

Multiply the *length* in *Inches* and *Parts*, by the *breadth* in *Inches* and *Parts*, and from the Right hand of the *Product* cut off so many *Figures* as are *Decimals* in the *length* and *Breadth* (if there be any) and the *Remainder* divide by 144, the *Quotient* is the *Feet*, and if any thing remain, divide it by 12, the *Quotient* is *Inches*.

Example.

	In.Par.
Length in Inches and Parts —	29.5
Breadth in Inches and Parts —	7.5
	144)206.50(1.5
	144
	12)062(5 Inches
	60

The *Content* is 1 Foot 5 Inches 02 and Remainder 2.

To perform this *Decimally*, without *Division*.

Take the *Length* and *Breadth* in *Foot* measure, and then it's thus ;

Ex.

Example

F.Par.

The *Length* 29 Inches $\frac{1}{2}$, or ——— 2.46The *Breadth* 7 In. or 0.58, *Inverted* is 85

1230

197

The Content is 1 Foot 5 In. $\frac{1}{4}$, or *Feet* 1.427

After the same manner may all the foregoing Examples be wrought.

PROB. V. *Directions for measuring Joy-ners and Painters Work; with the manner of taking their Dimensions.*

Joyners and Painters Work, are generally agreed for by the Yard, and therefore having cast up their *Dimensions*, they bring the whole *Sum* into Yards, by dividing the *feet* by 9.

Now in taking the *Dimensions* of *Joy-ners*, or *Painters Work*, such as *Polletion*, and *Beadwork*, you must by a Line girt the *Bends* and *Hollows*, and so bring it down to the *Bottom*, after which measure the *length* of the *line* by your *Rule*, setting it down for one of the *Dimensions*, then measure the *length* of the former *height*, and set it down for a second *Dimension*.

Note, That *Joyners Measure*, *Window-shuts*, and *Doors*, are *Work and half*, because they are workt on both sides

The

The *Painting of Windows* are generally agreed for by so much the *Light*, and *Casements* at so much a *Casement*.

In *Foyners*, and *Painters Work*, Deductions are made for all *Windows*, and *Chimneys*. *Example.*

A *Foyner* hath wainscotted a *Room* 44 feet and a half in *Compass*, and 9 feet three quarters in *height*; what is the *Content* by the *Sliding Rule*?

Set 1 on the *Double Scale B*, to 44 feet $\frac{1}{2}$ on the *Double Scale A*, then against 9 feet three quarters on the *Double Scale B*, is 433 feet $\frac{1}{2}$ on the *Double Scale A*, the *Content*: Or thus, set 9 on the *line B*, to 44 $\frac{1}{2}$ on the *line A*, then against 9 $\frac{3}{4}$ on the *line B*, is 48 *Yards* on the *line A*, which is the *Content*.

Decimally. F.Par.

The *Compass* of the *Room* 44.50

The *Height* — — — — — 9.75

22250

31150

40050 var. fee. In.

9)433.8750 (48.01.0 $\frac{1}{2}$

36

The *Content* is 48 *Yards* 073

1 *Foot* 10 *Inches* $\frac{1}{2}$

72

01

And

And by *Contraction*, the said *Example* is thus,

F.Par.

The *Compass* of the Room 44 feet $\frac{1}{2}$ is 44.5

The Height 9 feet $\frac{3}{4}$ or 9.75, Inverted is 57.9

4005

311

22

The Product is

Feet 433.8

The F. Multiply'd by 0.111, Inv. is 111.0

4338

434

43

The *Content* as before in Yards is 48.15

How to measure Painters-Work by the Sliding-Rule.

Example. There is a piece of *Painting* 13 feet $\frac{1}{2}$ broad, and 23 feet $\frac{1}{2}$ long Set 9 on the *Double Scale* B, to 13 $\frac{1}{2}$ on the *Double Scale* A, then against 23 $\frac{1}{2}$ on the *Double Scale* B, is 35 Yards $\frac{1}{4}$ on the *Double Scale* A, which is the *Content* of such a piece of *Painting*.

Decimally

Decimally.

F.Par.

Length 23 Feet $\frac{1}{2}$ or ——— 23.50

Breadth 13 Feet $\frac{1}{2}$ or ——— 13.50

117500

7050

2350

yar. fee. In.

9)317.2500(35. 2. 3

27

047

45

Content is 35 Yards

2 Feet 3 Inches.

02 foot.

More Examples.

Breadth $4\frac{1}{2}$ feet } Length 22 feet { 11 Yds.

Breadth $15\frac{1}{4}$ feet } Length $19\frac{1}{2}$ feet { 33 Yds.

Breadth 10 feet } Length 30 feet { 33 Yds. $\frac{3}{4}$

Breadth 19 feet } Length 29 feet { 61 Yds. $\frac{1}{4}$

P R O B. VI. *The measuring of Plaisterers and Paviers-Work by the Sliding-Rule.*

Example 1. Of Plaistering.

LET there be a *Cieling* plaistered, whose length is 25 feet 3 Inches, and the breadth 15 feet 6 Inches : Set 9 on the double Scale B, to $25\frac{1}{4}$ on the double Scale A ; then against $15\frac{1}{2}$ on the double Scale B, is 43 Yards and almost a half on the double Scale A, which is the Content.

Example

Example 2. Of Paving.

Let there be a piece of *Paving* 34 feet $\frac{1}{2}$ long, and 12 feet $\frac{1}{2}$ broad ; set 9 on B, to 34 $\frac{1}{2}$ on A, then against 12 $\frac{1}{2}$ on B, is 48 *Tards* almost the *Content*.

P R O B. VII.

The measuring such *Superficies* as are measured by the *Square* of 10 feet (*viz.* 100 Feet in a *Square*, for if you multiply 10 by 10 it makes 100) such as *Flooring*, *Roofing*, *Partitioning*, *Tyleing*, &c.

By the Sliding Rule.

The *Rule*. Set 100, or 1 in the middle, to the *length* ; against the *breadth* is the *Content*.

Example.

There is a *Floor* whose *length* is 61 feet and $\frac{1}{2}$, the *breadth* 14 feet and a *quarter*, set 100 on B, to 61 $\frac{1}{2}$ on A ; then against 14 $\frac{1}{4}$ on the *Double-Scale* B, is 8 *square* $\frac{3}{4}$ on the *Double-scale* A, for the *Content*, being 8 *Square* 75 Feet.

Decimally.

Multiply the *length* by the *breadth*, and from the *Product* cut off 2 more *Decimals* than is in the *length* and *breadth*, the *Figures* remaining are the *Squares*.

C

Ex-

Example.

F.Par.

Length 61 Feet $\frac{1}{2}$ or in Foot measure 61.50Breadth 14 Feet $\frac{1}{4}$ or in Foot-measure 14.25

30750

12300

24600

6150

Content 8 Squares $\frac{3}{4}$ or 76 Feet—8-763750By *Contraction* the same *Example* is thus,Breadth 14 F $\frac{1}{4}$ is in Foot-measure Feet 14.25Length 61 Feet $\frac{1}{2}$, or 61.5, Inverted is 5.16

8550

142

71

Product (cutting off 3 places is) Squares 8.763

*More Examples.**Contents.*

Length 42 feet	} Breadth	24 $\frac{1}{2}$ ft.	} 10 squares	29 $\frac{1}{2}$ feet	
Length 64 feet		29 ft.		18 squares	56 $\frac{1}{2}$ feet
Length 86 feet		35 $\frac{1}{2}$ ft.		30 squares	53 $\frac{1}{2}$ feet

Deductions in this Problem.

In *Carpenters-Work*, you are to *deduct* for all *Well-holes* in your *Flooring*, for all *Chimney-hearths*, and the like.

Also in *Partitioning*, *Deductions* must be made for all *Doors* and *Windows* that are measured in.

In *Roofing* make no *Deductions* for *Window shafts*, or *Sky Lights*, because they are more trouble to the *Workman* than the *Stuff* is worth that would cover them.

C H A P.

Having in the former Part of this Treatise shewed the Measuring of all manner of Superficies, likewise all sorts of Regular Figures : I shall now give you some Instructions for the taking the Dimensions of Trees, or Round Timber, and so proceed to the Measuring of such, and all manner of Solids.

THE Tree being cut down, the Custom is to Gert it, as is shewed in the beginning of the next Chapter, and for the length they account from the *But End*, up so far as the Tree will hold half a foot Gert when twice folded.

The *Dimensions* being taken, the Tree is to be measured by Chapter the sixth, as square Timber.

If the Tree have great *Boughs* that will hold half a foot Gert, such *Boughs* are called *Timber*, and they are measured and are added to the whole.

1. *Note*, If round, rough Timber be measured for Sale ; the common way among *Artificers* in allowing for Kind or Bark is thus : if the Gert or fourth part of the *Circumference* of the Tree be $\frac{7}{10}$ or half a foot, they allow $\frac{7}{10}$ or half Inch half quarter ; if the 4th part of the *Circumference*

be a *foot*, they allow $\frac{1}{4}$ °, or 1 *Inch* and almost a quarter; if 1 foot $\frac{1}{2}$ *Gert* $\frac{1}{4}$ °, or an *Inch* and above three quarters for the *Bark*, &c. But for *Beach*, *Elm*, *Ash*, and such that is thin *Bark'd*, then the *Allowance* must be a small matter less.

2. I have seen great difference in the *Gert* of a *Tree*, in the space of two feet, or less, and that hath been generally where one or two *Arms* have been cut off: In such a *Case* it is necessary to *gert* the *Tree* twice or thrice, if there be any great *Difference* or otherwise there will be loss to the *Buyer*, or *Seller*. Again, they say the *Buyer* hath Priviledge to *Gert* any where between the *middle* and the *Ground end*, if it be for his Advantage.

Lastly, The *Content* of any piece of *Timber* being found in feet, if divided by 50, you have the *Content* in *Loads*: But some will have a *Load* to be 40 solid feet, therefore you may take which of the two is most customary with you. The Reason why the *Difference* is, they say, because it is supposed that 40 feet of round *Timber*, or 50 feet of hewn *Timber*, weigh about a *Tunn*, or twenty hundred Weight, which is commonly accounted a *Cart-load*.

CHAP. VI. *The Measuring of Round Timber the common Way.*

TAKE the *length in feet, half feet, (and if desired) in quarters*; then measure half way back again, where *Gert the Tree* with a small *Chord or Chalk line*: Double this line twice very even. This fourth part of the *Gert or Circumference* (I call the *Gert*) measure in *Inches, Halves and Quarters of Inches*; but be sure the *Length* be given in *feet, &c.* and the *side of the Square or Gert in Inches*.

So you have always three *Numbers* given, to find the fourth, *viz.* 12 on the *Gert-line* for the first, the *length in feet* always for the second, and the *Gert or side of the Square* for the third, in *Inches, Halves and Quarters*.

Now we come to the *Rule*. Set 12 on the *Gert-line D*, to the *length (in feet, &c.)* on the *Double-Scale C*, then against the *side of the Square* on the *Gert-line D*, (in *Inches, Halves and Quarters*) you will find, on the *Double Scale C*, the *Content*.

Note, This *Rule* is *General*.

Ex. 1. Suppose the *gert* of a *Tree* in the middle be 64 *Inches*, and the *length* 31 *feet*, what is the *Content*? Set 12 on the *gert-line D*, to 31 *feet* on the *Double-Scale C*;

C 3

then

then against 16, the one fourth of 64, on the *Gert line D*, is 55 feet, the *Content* on the *Double-scale C*.

2. A Piece of Timber is 15 feet Long, and one fourth of the *Gert* 42 Inches: Set 12 on the *Gert-line D*, to 15 on the second length of the *Double scale C*; then against 42 at the beginning of the *Gert line D*, is on the *Double scale C*, 184 feet the *Content*. Reckoning the first 1 at the beginning of the line of *Numbers* (or *Double-scale*) to be 100, the 8 *Grand Divisions* 80, the two *small ones* 4; so accounting all together makes (as I said before) 184 feet.

3. A Length is 9 feet three quarters, and one fourth of the *Gert* 39 Inches, set 12 on the *Gert-line D*, to $9\frac{3}{4}$ on the line of *Numbers C*, and against 39 at the beginning of the *Gert-line D*, is 103 feet the *Content* on the *Double-scale* of *Numbers C*.

4. The Length 9 Inches; the quarter of the *Gert* is 35 Inches. Now because the length being not one foot, measure it by your line of *Foot-measure*; and see what part of a foot it makes, a foot supposed to be divided into a hundred parts: Or do thus, set 12 on the *Double-scale B*, to 100 on the *Double-scale A*, then against the length in Inches, namely, 9 on the *Double-line B*, is 75 on the *Double-scale A*, for the *Decimal*

mal or part of a *Foot*: Then set 12 on the *Gert-line D*, to 75 in the first length of the *Double-scale C*, then against 35 on the *Gert-line D*, is 6 feet $\frac{4}{5}$, or almost half a *Foot* on the *Double-scale C*, for the *Content*.

5. A *Rail* is 16 feet long, the quarter of the *Gert 3 Inches*; set 12 on the *Gert-line D*, to 16 on the first length of the *Double-scale C*, then against 30 (now called 3,) on the *Gert line D*, is just 1 *foot* the *Content*, on the *Double-line C*.

More Examples.

One fourth	11 Inches	The leng. in feet.	40 $\frac{1}{2}$	} The Content in feet and parts are	34 feet
of the Girt	16 Inches		39 $\frac{1}{2}$		70 feet $1\frac{3}{5}$
or side of	14 Inches $\frac{1}{2}$		50		68 feet
the Square	21 Inches		48		147 feet $1\frac{2}{5}$
in these	8 Inches $\frac{3}{4}$		36 $\frac{1}{2}$		19 feet $1\frac{4}{5}$
Examples is	31 Inches		24		160 feet

In taking all the *Dimensions* in *Foot-measure*, it's performed by the *Sliding Rule*, sooner than by *Inches*: thus count 10, 20, 30, 40, &c. on the *Gert-line* to be 1, 2, 3, 4, &c. in *Foot-measure*, and then place 10 on the *Gert-line D*, to the Length of the Tree, on the *Double-line C*; and against the *Gert* in *Foot-measure* on the *Gert-line D*, standeth the *Content* on the *Double line C*.

1. *Example* before mentioned. A Tree in Length 31 Feet, and Gerts 64 Inches or Feet $5\frac{4}{5}$ it's fourth is *Foot* $1\frac{3}{5}$, what's the *Content*?
C 4 Set

Set 10 on the *Gert-line* D, to 31 Feet on the *Double-line* C; then against 1 Foot 33 parts, on the *Gert-line* C, is 55 Feet on the *Double-line* C, which is the *Content* as before.

2. A Piece of Timber 15 Feet Long, and one fourth of the *Gert* 42 Inches, or Feet $3\frac{1}{4}$, what's the *Content*.

Set 10 on the *Gert-line* D, to 15 on the first part of the *Double-line* C; then against 3 Feet 5 Tenths, on the *Gert-line* D, is 184 Feet, on the *Double-line* C, the *Content* Requir'd. Again,

3. A Length is 9 feet $\frac{3}{4}$ or 9 feet $1\frac{3}{4}$, and one fourth of the *Gert* 39 Inches, or 3 Feet $1\frac{3}{4}$: Set 10 on the *Gert-line*, to $9\frac{1}{4}$ on the *Double-line* C; and against $3\frac{3}{4}$, on the *Gert-line* D, is beyond 100 on the *Double-line* C: In such Cases take half the Length, and then the *Content* must be doubled. As here.

Set 10 on the *Gert-line*, (to the half of $9\frac{3}{4}$) $4\frac{3}{4}$; and then against $3\frac{3}{4}$ is $51\frac{3}{4}$, the double is 103 feet, the *Content* requir'd.

4. The Length 9 Inches or $\frac{3}{4}$ of a Foot, the quarter of the *Gert* 35 Inches or 2 Feet $\frac{1}{4}$, set 10 on the *Gert-line*, to $\frac{3}{4}$ in the *Double-line* C, and against 2 feet $\frac{1}{4}$ in the *Gert-line*, is 6 feet $\frac{1}{4}$ on the *Double-line* C, the *Content* Requir'd. Again,

5. A

5. A Rail 16 feet long, the quarter of the Gert 3 Inches, or $\frac{2\frac{1}{2}}{10}$ of a Foot, what's the Content?

Set 10 in the *Girt-line*, to 16 in the *Double-line*, then against $\frac{2\frac{1}{2}}{10}$ in the *Gert-line*, is 1 Foot the Content on the *Double-line C*.

And in like manner may all the Examples foregoing, be wrought by the *Sliding-Rule*, if you take the fourth of the Gert in *Foot-measure*; for 11 Inches count $\frac{2\frac{2}{5}}{10}$, for 16 Inches count $1\frac{\frac{3}{5}}{10}$, for 14 Inches count $1\frac{\frac{1}{5}}{10}$, for 21 Inches count $1\frac{7\frac{1}{2}}{10}$, for 8 Inches $\frac{3}{4}$ count $\frac{7\frac{3}{4}}{10}$, and for 31 Inches count $2\frac{\frac{1}{5}}{10}$, and so for the Length 40 feet $\frac{1}{2}$ is $40\frac{\frac{1}{5}}{10}$, and so on for any other, which may be seen by the Table of *Foot-measure*, or by the Line of *Foot-measure* on the *Sliding Rule*.

If it be required to find the Content of any piece of Timber in *Loads*, at 40 feet the *Load*, use half the Gert instead of the whole.

Example.

A Length is 15 feet, and a Quarter of the Gert is 42 Inches; set 12 on the *Gert-line D*, to 15 on the first length of the *Double-scale C*; then against 21, (which is half of 42 one quarter of the) Gert on the *Gert-line D*, is 46 on the *Double-scale C*, whereof 4 is 4 *Loads*, and the 6 multiplied by 4,

by 4, makes 24 *feet*; which is 4 *Load* 24 *feet*, or 4 *Load* $\frac{6}{10}$.

If at any time you have the *Content* in *Loads*, and you would have it in *Feet*; 'tis but multiplying the *Content* found in *Loads* by 4, the *Square* of 2, by which you divided your *Gert*: So 46 multiplied by 4, is 184 *feet*.

If you take the *Dimensions* in *Foot-measure*, you may find the *Loads* contained in any *Timber*, thus. If a length be 15 *Feet*, and quarter of the *Gert* 42 *Inches*, that is 3 *Feet* $\frac{1}{4}$; whose half is 1 *Foot* $\frac{7}{16}$. Then set 10 in the *Gert-line* D, to the Length 15 on the *Double-line* C, then against $1\frac{7}{16}$ (the half of $3\frac{1}{4}$ one quarter of the *Gert*) on the *Gert-line* is $4\frac{6}{10}$ on the *Double-line* C, which is 4 *Load* $\frac{6}{10}$ or 4 *Load* 24 *Feet* the *Content* required.

If at any time you would know the *Content* of any piece of *Timber* by *Natural Arithmetick*; having *Gert* your *Tree*, and taking one fourth part for the side of the *Square*, observe the following *Rule*.

Multiply the length of the side of the *Square* in *Inches* into it self, and the *Product* by the length in *Feet*, and this *Product* divide by 144, the *Quotient* is the *Content* in *feet*, and if any thing remain, divide again by 12, the *Quotient* is the odd *Inches*.

So

So in Example the second.

A piece of *Timber* is 15 feet long, the quarter of the *Gert* is 42 Inches, what is the *Content* of the *Tree*?

$$\begin{array}{r}
 \text{The side of the Square} \text{ --- } 42 \text{ Inches} \\
 \text{Multiplied by it self} \text{ --- } 42 \\
 \hline
 84 \\
 168
 \end{array}$$

$$\begin{array}{r}
 \text{The Product is Inches} \text{ --- } 1764 \\
 \text{Multiplied by the length} \text{ --- } 15 \text{ feet.} \\
 \hline
 8820 \\
 1764 \text{ feet. Inch.}
 \end{array}$$

$$\begin{array}{r}
 144 \overline{) 26460} (183. 9. \\
 \underline{144} \\
 1206 \\
 \underline{1152} \\
 00540 \\
 \underline{432} \\
 12 \overline{) 108} (9 \text{ Inches} \\
 \underline{108}
 \end{array}$$

Content is 183 Feet 9 Inches 000

But by *Decimal Arithmetick*, taking all the Dimensions in *Foot-measure*, it's much shorter, as follows by the forefaid *Example*.

Side

Side of the Square 42 I.in Foot measure F. Part.
 Multiply it by it self ————— 3.5

175
 105

The Product is ————— Feet 12.25
 Multiply it by its Length ————— Feet — 15

6125
 1225

Last Product is the Cont. in Feet — 183.75
 That is 183 Feet $\frac{75}{100}$ or 9 Inches as before.

CHAP. VII.

*Of the Measuring of Round Timber or
 Trees, the True Way, by the Sliding-
 Rule, and Arithmetically.*

THE last way being the common way
 of *Measuring Round Timber*, but it
 giveth not the true *Content* but is always
 too little (though it be generally used : I
 shall now give you a point on the *Rule*,
 which must be used instead of 12 ; which
 point you may cut with a sharp pointed
 Penknife at 10.635, but much better by
 the *Instrument-Maker*.

So in the second Example foregoing,

Let the Length be 15 feet, the one fourth
 of the *Gert* is 42 Inches : Set the said point
 (which is 10.635 the true point) to 15 the
 Length

Length, then against 42, at the beginning of the *Gert-line*, is 233 feet on the *Double-scale* for the *Content*; whereas the common way giveth but 184 feet.

Note, That the *common Measure* is to the *true Measure*, as 11 is to 14; so that if you set 11 on the *Double-scale* to the *Content* found the *common way*, 14 shall point out the *true Content* of the same; and if you set 14 to any *true Content*, 11 shall point out the *Content* the *common way*; this is done on the *Double-Line*.

The *Gert* being taken in *Foot-measure*, the *Point* for *True Measuring* is 8862 or $\frac{8862}{10000}$ or more briefly $\frac{886}{1000}$. And then for the foregoing *Example*.

The Length being 15 feet, the one fourth of the *Gert* 42 Inches; that is, 3 feet $\frac{3}{4}$ or feet 3.5 Tenths, I demand the *true Content*.

Set the foresaid *Point* $\frac{886}{1000}$ on the *Gert-line* D, to the Length 15 Feet on the *Double-Line* C, (in it's first part or beginning); then against feet 3 5 Tenths (which is 35) on the *Gert-line* D, is 233 feet on the *Double-line* C, which is the *true Content* Requird. Again,

Suppose a *Round Tree* in Length 31 feet, and one Quarter of its *Gert* 16 Inches, that is 1 Foot $\frac{3}{4}$, or Foot 1.33 Parts; what's the *true Content*.

Set

Set 89 on the *Gert-line D*, to 31 Feet on the *Double-line C*, then 1.33 on the *Gert-line D*, points to 70 Feet on the *Double-line C*, the true Content required; whereas by the 1st Example of Chapter the 6th, the Content of this Tree is but 55 Feet, by the common way of Measuring, which is no less than 16 Feet short of Truth.

I shall next shew how to find the true Content of Timber, Arithmetically, as followeth.

By a Fixed-Number or Decimal, .2821, which multiply by the *Gert.* of the Tree, taken in Inches, and from the Product cut off four Figures to the Right-hand, the remaining to the Left-hand, are the Inches for the side of the Square equal to the *Gert* or Circumference of the Tree.

And for understanding it, take these two or three Examples, how to find the side of the Square that shall be equal to the *Gert* or Circumference of the Tree, by this Fixt Number 2821, always to be used; when the *Gert* is Inches.

This Decimal, or Fixt Number is .2821

The *Gert* in the 2d Example is — 168 Inch.

22568

16925

2821

The Product is ——— Inches 47.3928

Here

Here the side of a *Square* equal to that *Gert* is 47 *Inches* and a *quarter*; for these four *Decimals* cut off, are so many parts of 10000, and .3928 is almost $\frac{1}{4}$ of a Foot, which is more than a *Quarter of an Inch*.

Another Example.

The *Fixt Number* is ————.2821

The *Gert* is ————48 *Inches*

22568

The side of a *Square* equal 11284

to this *Gert* is $13 \frac{1}{2}$ *In.* or *In.* 13.5408

Another Example.

The *Fixt Number* is ————.2821

The *Gert* is ————54 *Inches*

11284

The side of a *Square* equal 14105

to this *Gert* is $15 \text{ In. } \frac{3}{4}$ or *In.* 15.2334

I now proceed to work the foregoing *Piece of Timber* or *Tree*.

Arithmetically.

Multiply the *Inches* of the *Square* (with the first Left-hand Figure of the four which is cut off) into it self, and that *Product* by the *Length in Feet*, and divide the last *Product* by 144, the *Quotient* is *Feet*, and the *Remainder*, if any, divide by 12, the *Quotient* is *Inches*.

Exam.

Example.

F.Par.

The side of the Square is Inches--47.3
 Multiply by it self ————— 47.3

1419

3311

1892

In the *Product* cut off 2 Dec. — 2237.29Pt

The Length in Feet ————— 15

11185

2237 F.I.

144)33555(233.3

288

0475

432

0435

432

The *Content* of this
 Timber is 233 Feet 3 Inches — 003 Inches

Another Example for Practice.

There is a Round Tree whose *Gert* is 48
 Inches and the Length 8 Feet 9 Inches, what
 is the *Content*?

Multiply the Inches of the side of the
 Square equal to the *Gert* (with the first *Figure*
 on the Left-hand of the four cut off) into it
 self, and from the *Product* cut off two *Fi*
gures to the Right-hand, the Remainder
 multiply by the Inches of the Length of the
 Tree (and not by the Length in Feet) because
 the

the *Length* is *Feet* and *Inches*, therefore you must bring your *Length* into *Inches*, by multiplying them by 12, this last *Product* divide by the *Inches* that are in a *square foot* of *Timber*, namely 1728, the *Quotient* is the *Feet*, the *Remainder* (if any) divide by 144, the *Quotient* is the odd *Inches*.

Example.

The Side of the *Square* being *Inches* 13.5

Multiply by it self ————— 13.5

F. In. 675

The *Length* ——— 8.9 405

Multiplied by ——— 12. 135

makes ——— 105 *Inches*. 182.25

The *Length* in *Inches* is ——— 105 *In.*

910

1820

The *Content* of this 1728)19110(11F.
Round-Tree is 11 *Feet* 1728.

And 102 Remains, which 01830

is not one *Inch*. 1728

0102

Note. The *Fix'd-Number*. 2821 is the side of a *square*, that's equal to a *Circle* whose *Gert* is 1 *Inch*, or 1 *Foot*, or 1 any *Thing*.

Also the *Number* 10.635 is the side of a *Square*, that's equal to a *Circle* whose *Diameter* is 12 *Inches*.

D

Also

Also .8862 (more shorter .89) is the Side of a Square, that's equal to a Circle whose Diameter is 1 Foot, or 1 any Thing.

Now to perform this Arithmetically, when all the Dimensions are taken in Foot-measure.

The Rule. Multiply the whole Gert, by the Fix'd-Number .2821, and the Product is the Side of a Square equal to that Gert; Then Multiply that Product by it Self, and this last Product multiply by the Length of the Tree, and it produceth the Content Requird.

Example. Let the Length be 15 Feet, and the Gert 14 Feet. I demand the true Content? The Fix'd Number is ————.2821
Multiply by the Gert 14 Feet, Inverted is .41

2821

1128

The Product is the side of the Square Ft. 3.949
Multiply by it self Inverted is ——— 949.3

11847

3546

156

27

The Product is the Square — Feet. 15.576
Multiply by the Length 15 Ft. Inverted-51

15576

7785

The Product is the Content — Feet- 233.51
That is 233 Feet $\frac{5}{16}$ or 233 Feet 6 Inches.

Another

Another Example for Practice.

A Round-Tree, whose *Gert* is 48 Inches,
or 4 Feet, and *Lengt.* 8 Ft. 9 In. or 8 feet $\frac{75}{100}$

The *Fix'd Number* is ————.282

Multiply by the *Gert* 4 Feet ———— 4

Product is the *Squares-Side* ———— Foot 1.128

Multiply by it Self, *Inverted* is ———— 821.1

1128

112

22

8

The *Product* is the *Square* ———— Foot--1.270

Multiply by the *Length* 8.75, *Invert.* is 57.8

10160

889

60

The *Product* is the *Content* ———— Feet-11.109

C H A P. VIII.

To measure the C U B E.

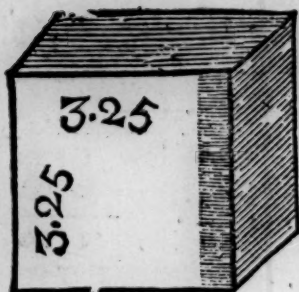
LET there be a *Cube* whose sides are
3 Feet 3 Inches, what is the *Content*?
By the Sliding-Rule.

Set 12 on the *Gert-line* D, to $3\frac{3}{4}$ on the
Double-scale C; then against 39 Inches the
side of the *Cube* on the *Gert line* D, is 34
Feet and $\frac{1}{4}$ on the *Double-scale* C, the *Con-*
tent Required.

D 2

De-

Decimally.



F.Par

The side 2F. 21 or 3.25

Mult. by the same 2.25

1625

650

975

The 1st Prod. is 10.5625

Mul. by the same 2.25

528125

211250

216875

The Content is 34 Feet $\frac{1}{3}$ or Feet 34.328125

But by Contraction thus.

F.Par.

The Side of the Cube 3 Feet 2 Inches, or 3.25

Multiply by 3 Feet 25 parts, Inverted is 52.2

975

65

16

The First Prod call'd the Square, is 1056

Multiply by 3 Feet 25 parts, Invert. is 52.2

3168

211

53

The Content 34 Feet $\frac{1}{3}$ as before, Feet 34.32

CHAP.

CHAP. IX.

To measure Timber that is neither Round, nor Square ; But first to find a mean Proportional between any two Numbers.

TO find this *mean-Proportional*, set the greater of the two Numbers on the *Gert-line*, to the same on the *Double-line* of Numbers ; then again, the Lesser on the *Double-line* of Numbers, is the *mean Proportional* on the *Gert-line* ; or set the lesser on the *Gert-line*, to the same on the *Double-line* of Numbers ; then against the greater on the *Double-line* of Numbers, is the *mean Proportional* on the *Gert-line* ; any one of these will do.

Note. Examples of this are in the next Problem.

P R O B. I.

To measure unequal Squared Timber, that is ; the Breadth and Depth are not Equal.

Measure the Length of the Piece in Feet and the *Breadth* and *Depth*, (at the end) in *Inches*. Then find the *mean-Proportional* between the *Breadth* and *Depth* of the Piece, as is taught (in Chap. 9. and) in the Example following. The *mean-Proportional* is the side of a *Square* equal to the end of the Piece ; which having found, the Piece may be measured as *Square-Timber*.

Example I.

In a Piece of Timber whose Length is 13 Feet, the Breadth 23 Inches, and the Depth 13 Inches; Set 23 on the Gert-line D, to 23 on the Double-scale C; then against 13 on the Line C, is 17.35, or $17\frac{1}{3}$ on the Gert-line D; then setting 12 on the Gert-line D, to 13 Feet the Length on the Line of Numbers C, then against $17\frac{1}{3}$ (the mean-Proportion) on the Gert-line D, is 27 Feet the Content Required.

Example II.

In Stone, which let it be 7 Feet 40 parts, or 7 Feet and about 5 Inches in Length, and 30 Inches in Breadth, and $23\frac{1}{2}$ Deep; set 30 Inches on the Gert-line D, to 30 on the Double-scale C; then against $23\frac{1}{2}$, on the Line of Numbers C, is $26\frac{1}{2}$, or 26.50, on the Gert-line D: Then set 12 on the Gert-line D, to 7.40. on the Line C, then against $26\frac{1}{2}$ on the Gert-line D, is 36 Feet the Content on the Double-scale C.

The Content of these two Examples by Arithmetick, is thus.

The First Example.

Let there be a Piece of Timber whose Length is 13 Feet, the Breadth 23 Inches, and the Depth 13 Inches.

The

The Rule.

Multiply the *Breadth* in *Inches*, by the *Depth* in *Inches*; and that *Product* Multiply by the *Length* in *Feet*, and divide the last *Product* by 144, the *Quotient* is *Feet*, and the *Remainder* (if any) divide by 12, the *Quotient* is *Inches*.

Example.

The Breadth 23 Inches

The Depth 13 Inches.

69

23

Note. This Example

The *Product* 299

by the *Sliding-Rule*

Multiply by 13 Feet

was 27 Feet by

897

Arithmetick it wants

299

1 Inch; for it is 26

144)3887(26F. Feet 11 Inches.

288

1007

864

12)143(11 In.

12

023

12

11 Remainder is $\frac{11}{12}$ of an Inch.

D 4

By

By Foot measure it's done thus,

F. Par.

Breadth 23 Inches in Foot-measure is 1.92
 Depth 13 In. or Feet 1.08 Inverted is 80.1

192

15

The Product is _____ Feet 2.07
 Multiply by the Lengt. 13 F. Invert. is 31

207

62

Content is 26 Feet 11 Inches, or Feet 26.9

The second Example, Decimally.

Let there be a piece of Stone 7 Feet 40 parts long, 2 Feet 50 parts in Breadth, and 1 foot 96 parts in Depth, what is the Content?

The Rule.

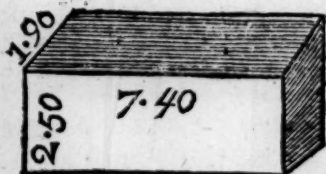
Multiply the Length by the Breadth, and the Product by the Depth or Thickness; and cut off from the last Product, as many places to the Left-hand as there be Decimals in the three Dimensions, the Integers remaining are Feet.

Exam-

Example.

F.Par.

The Length ————— 7.40
 The Breadth ————— 2.50
 37000
 1480



The Prod.F. 18.5000
 The Depth F. 1.96
 1110000
 1665
 185

The Content is 36 F. 3 I. or feet 36.260000

By Foot-Measure it's thus Contralled.

F Par.

The Stones Length 7 feet 5 Inc. that is 7.41
 Stones Breadth 30 I. or 2.5, Inverted is 5.2
 1482
 370

The Product is ————— feet 18.52
 Depth 23 Inches $\frac{1}{2}$ or 1.96, Inverted is 69.1
 1852
 1667
 111

The Content is 36 feet 4 Inches or feet 36.30

P R O B.

P R O B. II.

To find the Content of a Piece of Timber, whose End is in the Form of a Triangle; and both Ends alike Equal.

TO find the Content of such Timber, first find a *mean-Proportional* between the *Base* and half the *Perpendicular* (of the *Triangular End*) or between the *Perpendicular* and half the *Base*, both measured in *Inches*. Then is the *Mean Proportional* the *Side* of a *Square* equal to the *Triangle*.

Then to find the *Content*, set 12 on the *Gert-line D*, to the *Length* in *Feet* on the *Line of Numbers C*, then against the *mean-Proportion* on the *Gert-line D*, is the *Content* on the *Line of Numbers C*.

But the *Dimensions* being all taken in *Foot measure*, and the *mean-Proportional* found in the same: then set 1 on the *Gert-line D*, to the *Length* in the *Double-line C*; then against the *mean-Proportional* in the *Gert-line D*, is the *Content* in the *Double-Line C*.

Note. If the two sides of a *Triangle* be equal, the other Side is called the *Base*, but if the three sides be unequal, the longest side is the *Base*: From whence the nearest Distance, to the opposite *Angle*, is the *Perpendicular*. *Exam-*

Examp. A Piece of Timber 19 feet 6 Inches in Length, the Base of the Triangle at each End being 21 Inches, and the Perpendicular to each Base being 16 Inch. what's the Cont.

Set 21 Inches on the Gert-line D, to 21 on the Double-line C; then against 8 on the Line C, is $12\frac{2}{3}$ or 12.95 on the Gert-line D, the mean Proportional.

Then set 12 on the Gert-line D, to 19 Feet $\frac{1}{2}$ the Length on the Double-line C; and against 12.95 (the mean Proportional) on the Gert-line D, is $22\frac{3}{4}$ (or Feet $22\frac{8}{10}$ the Content Required) on the Double-line C. Or thus, Take all the Dimensions in Foot-Measure; and then the Length 19 Feet 6 Inches is 19.5; the Base 21 Inches is 1.75, and the Perpendicular 16 Inches is 1.33; Now set 1.75 on the Gert-line D, to 1.75 on the Double-line C, and against 0.67 on the Double line C, is 1.08 (on the Gert-line D,) for the mean-Proportional: Then set 1 on the Gert-line D, to the Length 19.5 on the Double-line C, and against 1.08 on the Gert line D, is 22.8 (or Feet 22 almost 11 Inches) on the Double-line C, for the Content, very near to that before.

Arithmetically.

The Rule; Multiply the Base by the Perpendicular (both taken in Foot-Measure) and halt that Product, Multiply'd by the Length,

Length, produceth the *Content* Required,
as in the foreſaid *Example*.

F.Par.

The *Base* 21 *In.* or in *Foot Measure* is 1.75

The *Perpendicular* 16 *In.* or 1.33 *Inv.* is 22.1

175

53

5

The *Product* is ———— *Feet* 3.22

Half the *Product* is ———— *Feet* 1.17

The *Length* 19 *F. 6 I.* or 19.5, *Inv.* is 5.91

117

105

6

The *Content* is 22 *Feet 10 Inches* or *F. 22.8*

P R O B. III. *To Measure Timber that
Tapers.*

THE *Length* measured in *Feet*, and
note one third of the *Length*, which
may be found by the *Sliding-Rule* thus;
Set 3 on the *Double-line A*, to the *Length*
on the *Double-line B*, then againſt 1 on
the *Double-line A*, is the third part on the
Double-line B: then if the *Solid* be round,
Measure the *Diameter* at each end in *Inches*,
ſubtracting the leſſer *Diameter* from the
greater, and add half the *Difference* to the
leſſer *Diameter*, the *Sum* is the *Diameter*
in

in the middle of the Piece; then set 13.54 on the *Gert-line* D, to the *Length* on the *Double Line* C, then against the *Diameter* in the middle on the *Gert line* D, is a fourth Number on the *Double-line* C, then set 13.54 or $13\frac{1}{2}$ of the *Gert-line* D, to the third part of the *Length* on the *Double Line* C; then against the *half Difference* on the *Gert line* D, is another fourth Number, on the *Double Line* C, these two fourth Numbers added together makes the *Content*.

Example. Let the *Length* be 27 Feet (the one third by the Rule is 9) the greater *Diameter* 22 Inches, and the lesser 18 Inches.

See the Operation.

The greater <i>Diameter</i> —————	22	Inches
The lesser <i>Diameter</i> —————	18	Inches
The <i>Sum</i> is —————	40	
The <i>Difference</i> —————	04	
The $\frac{1}{2}$ <i>Difference</i> —————	02	
The lesser <i>Diameter</i> —————	18	
		} added
The <i>Diameter</i> in the Middle ———	20	Inches.

Then set 13.54, or $13\frac{1}{2}$ on the *Gert line* D, to 27 on the *Double-line* C; then against 20 on the *Gert-line* D, is 58.900, that is 58 Feet $\frac{900}{1000}$ parts.

Again, let 13.54 of the *Gert-line* D, to 9 on the *Double line* C; then against 2 on the *Gert-line* (represented by 20) is .196 parts of a foot.

The

{ The first fourth Number—58 900 } added
 { The second fourth Number—.196 }
 { The Sum is the Content —59.096 }
 Which is 59 Feet $\frac{1}{4}$ Inch.

Note. If the Timber be Wainy, that is neither *Square* nor *Round*, take one *Wain* in and leave the other out.

The same done by *Foot measure*.

F. Par.

The Greater Diameter 22 Inches or 1.83

The Lesser Diameter 18 Inches or —1.5

The Sum of both Diameters is — Feet 3.33

Half is the middle Diameter — Foot 1.67

Difference of the Diameter is — Foot 0.22

$\frac{1}{2}$ Difference of the Diameter is — Feet 0.17

Then set 1.13 on the *Gert-line* D, to the Length 27 feet on the *Double-line* C; and then against 1.67 on the *Gert-line* D, is 58 feet $\frac{2}{10}$. Then,

Set 1.13 on the *Gert-line* D, to 9 feet, on the *Double-line* C; and then against 0.17, on the *Gert-line* D, is .196 Parts of a Foot, and both put together is the *Content*; that is, 58.9 and .196 added makes 59.096, or 59 Feet $\frac{1}{4}$ Inch, as before.

Suppose the Solid be *Square*, and having the same *Dimensions*; that is Length 27 Feet, the greater End 22 Inches *Square*, and the lesser End 18 Inches *Square*, what's the *Content*?

F. Par.

F.Par.

The greater Square 22 — In. or — 1.83

The lesser Square — 18 — In. or — 1.5

Sum of both squares 40 — In. or — 3.33

Half is the mid.Squ. 20 — In. or — 1.67

Difference of the Ends 4 — In. or — 0.33

Half Diff. of the Ends 2 — In. or — 0.167

Then to find the Content by the Inch-measure, it's thus. Set 12 on the Gert-line D, to 27 Feet (the Length of the Solid) on the Double-line C; and against 20 Inches (the Middle Square) on the Gert-line D, is 75 Feet $\frac{4}{10}$. Again let 12 on the Gert-line, to 9 Feet (one third of the Length) on the Double-line; and against 2 Inches (the half Difference of the Ends) on the Gert-line, is $\frac{23}{100}$ parts of a Foot; both together is 75 $\frac{63}{100}$ parts (which is almost 8 Inches) the Content of the Solid: Or thus, by Foot-measure.

Set 1 on the Gert-line, to the Length 27 Feet on the Double-line, then against 1 Foot 67 parts the (middle-Square) on the Gert-line, stands 75 Feet $\frac{4}{10}$, and setting 1 on the Gert-line, to 9 Feet (the one Third of the Length) on the Double-line; then against 0.167 (the half Difference of the Ends) on the Gert-line, is (on the Double-Line) $\frac{23}{100}$ parts of a Foot, and both together

ther 75 feet $\frac{4}{10}$ and $\frac{23}{100}$ is 75 feet $\frac{65}{100}$ Parts of a foot, as before, exactly agreeing both by *Inch-measure* and *Foot-measure*; and here note the Numbers that are fix'd in this kind are thus to be understood: 13.54057, &c. in short 13.54 is the *Diameter* of a *Circle* whose *Area* or *Content* is 144 *Square Inches*: And 1.1283814, &c. in short 1.13 is the *Diameter* of a *Circle* whose *Area* or *Content* is 1 foot, or 1 any Thing.

P R O B. IV.

To find how many Inches in length will make a Foot Solid, at any Gert being the Side of a Square, not exceeding 40 Inches.

L E T the Gert or Side of the Square upon the Gert-line be set to 1 on the Numbers, then against 41.57 of the Gert-line, is the Number of Inches on the Numbers that will make a Solid Foot.

Example.

Let the Side of a Square be 7 Inches, set 7 on the Gert-line D, to 1 on the Double-line C, then against 41.57 on the Gert-line D, is 35 Inches $\frac{1}{4}$ on the Double-line C, for the length of 1 Foot-solid.

To do the same in Foot-measure; the side of the Square 7 Inches, in Foot-Measure is .58 parts; which said .58 parts on the Gert-line D, being set to 1, on the Double-

Double-line C; then against 1 on the *Gert-line D*, is 2.94, that is 2 Feet 94 parts, or 2 Feet 11 Inches $\frac{1}{4}$ for the Length, to make one Foot of Timber.

PROB. V.

Having the Diameter of a Circle, or Round Piece of Timber; to find the Side of a Square within the Circle, or to know how many Inches the Side of the Square will be when the Round Timber is squared.

The Rule.

Set always 8.5 on the *Double-line A*, to 6 on the *Double-line B*; then against the *Diameter* on the *Line A*, is the *Side of the Square* on the *Line B*.

Example.

Let the *Diameter* be 18 Inches; set 8.5 on A, to 6 on B; then against 18 on A, is 12 $\frac{1}{4}$ on the *Line B*, for the *Side of a Square* within that *Circle*.

The same done in *Foot-measure*, the *Diameter* being 18 Inches is in *Foot-measure* 1.5; Then set 1 on the *Double-line A*, always to .707 or .71 almost, on the *Double-line B*; then against the *Diameter* 1.5 on the *Double-line A*, is 1.7 on the *Double-line B*; that is *Foot* 1.7 *Tenths* the *Side of a Square* within a *Circle*, whose *Diameter* is *Foot* 1.5 *Tenths*. And here note the given Numbers 8.5, and 6 (but

E more

more truly 1, and .707) are, one the *Diameter* of a *Circle*, the other the *Side* of a *Square* within that *Circle*.

P R O B. VI.

By having the Gert of a Tree, or Round Piece of Timber, to find the Side of a Square within.

The Rule.

Set 10 to 9 on the Line A and B, then against the *Gert* on the Line A, is the *Inches* for the *Side* of the *Square*, on the Line B.

Example.

Let the *Gert* be 16 *Inches*, Set 10 on the Line A, to 9 on the Line B; then against 16 on the Line A, is $14\frac{1}{4}$ on the Line B, for the *Side* of the *Square*.

By *Foot-Measure* it's thus; the *Gert* 16 *Inches* is *Foot* 1.33 *parts*; then set 10 on the *Double-line* A, to 9 on the *Double-line* B, and against the *Gert* 1.33 on the *Double-line* A, is on the *Double-line* B, 1.19, that is 1 *Foot* 19 *parts*, which is 1 *Foot* 2 *Inches* $\frac{1}{4}$ for the *Side* of the *Square* within.

And *Note*. The Numbers 10, and 9, or 1, and .9, shews when the *Square* within the *Circle* is 1, the fourth part of the *Circumference* is $\frac{2}{10}$ parts of the same.

By these two last Problems you may know (before a *Piece* of *Timber* is hewn) how

how many *Boards* or *Planks* of any Thickness it will make.

P R O B. VII.

By the fourth part of the *Gert* of Round-Timber, to find the Side of a Square equal to it.

The Rule.

Set 1 on the Line A, to 1.128 on the Line B; then against the (one fourth of the whole) *Gert* on the Line A, is on the Line B, the Side of the Square equal to it.

Example. Let the *Gert* (that is the one fourth of the whole *Gert*) be 16 Inches; how much is the Side of the Square equal to it?

Set 1 to 1.128 but shorter to 1.13, on the Lines A and B; then against 16 on the Line A, is 18 on the Line B; which sheweth that a Square whose side is 18 Inches, is equal to a Circle whose *Gert* is 64 Inches, or one fourth of its *Gert* is 16 Inches.

By *Foot-Measure*, the Rule being set as before, 1 against 1.13; then against Foot 1.33 Parts (equal to 16 Inches) you will find 1.5, that is 1 Foot $\frac{3}{4}$, equal to 1 Foot 6 Inches, the Side of a Square equal to the given *Gert*, the same as before.

To Measure Brick-Work.

Brick-Work is measured by the Rod of 16 Feet and a half, whose Square is $272 \frac{1}{4}$; which sheweth that the Point on the Double-line is $272 \frac{1}{4}$; but 272 being marked on the Rule will serve (without any considerable Error) a Brick and $\frac{1}{2}$ thick, and is the *Fix'd Number*.

An Example.

There is a *Brick-wall* whose Length is 564 Feet the Height is 10 Feet and $\frac{1}{2}$: Set 272 on the Double-line A, to 564 on the Line B; then against $10 \frac{1}{2}$ on the Line A, is $21 \frac{7}{10}$ Rod, the Content on the Double-line B.

Note 1. Always the *Fix'd Number* that goeth with the Question is called the first Number, which you may set to either of the other Numbers.

Note 2. That $272 \frac{1}{4}$ Feet makes a Rod of *Brick-work*, at a Brick and a half Thickness: if it be thicker fewer Feet go to a Rod; if thinner the more.

If you demand how many Feet makes a Rod at 2 Bricks Thickness: Two being the first or fix'd Number that goeth with the Question, must be set to $1 \frac{1}{2}$; then against $272 \frac{1}{4}$, is about 204, viz. 204 Feet $\frac{19}{100}$, And so for any other Thickness, for which

Take

Take this General Rule.

Set $1\frac{1}{2}$ to any Thickness; then against $272\frac{1}{4}$ on the second Length is the Number of Feet that makes a Rod to that Thickness, and is called the *First Number* for that Thickness, as in the Table following.

By this Table, made by the same Rule, by the half Bricks Thickness of the Wall, you have the first Number by Inspection: as thus, against 2 Bricks $\frac{1}{2}$ or 5 half Bricks thick, is 163 Feet, for a Square Rod, and so for any other.

$\frac{1}{2}$ Bricks thick.	Square Feet in a Rod on the Superficies.	$\frac{1}{2}$ Bricks thick.	Square Feet in a Rod on the Superficies.
$\frac{1}{2}$. 1	817 Feet	$\frac{1}{2}$. 7	117 Feet
1. 2	408 Feet	4. 8	102 Feet
$\frac{1}{2}$. 3	272 Feet	$\frac{1}{2}$. 9	91 Feet
2. 4	204 Feet	5. 10	82 Feet
$\frac{1}{2}$. 5	163 Feet	$\frac{1}{2}$. 11	74 Feet
3. 6	136 Feet	6. 12	68 Feet

C H A P. XI.

Measuring of Land.

LAND is usually measured by the Pole, Perch, or Rod, which is 16 Feet $\frac{1}{2}$ long; 40 Poles in Length and 4 in Breadth makes an Acre, so that an Acre of Land contains 160 Square Poles; half an Acre is 80, and a quarter is 40.

Some use a *Pole-Chain*, and others a 4 *Pole-Chain*, the best for use is that of four *Poles*. This *Chain* is called GUNTER'S *Chain*. It is divided into 100 *Links* or *Parts*, every *Link* is 7 *Inches* and 92 *Parts* of an *Inch* in Length.

PROB 1. By the *Pole Chain*, There is a Plot of Ground 35 *Pole* or *Perch* broad, and 185 *Pole* long, how many *Acres* is the *Content*?

By the Sliding-Rule.

Thus, Set 160 to the Breadth, then against the Length is the *Content*.

Example.

Set 160 on the *Double-line A*, to 35 the Breadth on the *Double-line B*; then against 185, the Length on the *Line A*, is $40 \frac{46}{100}$ (that is 40 *Acres* and almost $\frac{1}{2}$) on the *Double-line B*; the *Content*.

Arithmetically.

The Rule. Multiply the Length in *Poles* by the Breadth in *Poles*, and divide the Product by 160 (the *Poles* in an *Acre*) the Quotient is the *Acres*, if any remains, divide again,

By $\left\{ \begin{array}{l} 120 \\ 80 \\ 40 \end{array} \right\}$ the Quotient is $\left\{ \begin{array}{l} 3 \\ 4 \\ 1 \\ 2 \\ 1 \\ 4 \end{array} \right\}$ of an *Acre*.

Example.

Example.

The Length ————— 185 Poles.

The Breadth ————— 35 Poles.

925

But 75 Pole remain

555

ning after the first Division, viz. by 16 | 0) 647 | 5 (40 Acres

64

160, which 75 being divided by 40, the last Remainder

4 | 0) 007 | 5 (1 quar.

4

is 35, which makes the Content 40 Acres

35 Poles remaining.

1 Quarter and 35 Poles, or almost 40 Acres and $\frac{1}{2}$.

More Examples by the Rule.

Content.

Breadth { 42 } Pole { Length { 49 } Pole { 12 Acres $\frac{86}{100}$ or $12 \frac{3}{4}$
 { 53 } { 64 } { 21 Acres $\frac{3}{4}$ or $21 \frac{1}{4}$
 { 64 } { 85 } { 34 Acres just.

P R O B. II.

By the four Pole-Chain. There is a Plot of Ground containing 16 Chains 25 Links in Breadth, and 57 Chains 30 Links in Length, what is the Content of that piece of Land?

By the Sliding Rule.

The Rule. Set 10 on the Double-line, to the Breadth in Chains and Links on the other, then against the Length in Chains and Links is the Content.

Example.

Set 10 on the *Double-line A*, to 16.25 on the *Double-line B*, then against 57.30 on the *Double-line A*, is 93 Acres and something more, for the *Content* on the *Double-line B*.

Arithmetically.

Length—Chains—57.30 Links.

Breadth--Chains---16.25 Links.

$$\begin{array}{r} 28650 \\ 11460 \\ 34380 \\ 5730 \end{array}$$

Acres 93|11250 cut off 5 Figures

$$\begin{array}{r} 4 \\ \text{no Roods}---145000 \\ 40 \end{array}$$

$$\text{Poles}---18100000$$

Note. 4 Roods makes an *Acre*, and 40 Poles, Perches, or Rods makes one Rood, or *Quarter* of an *Acre*.

More Examples by the Rule.

$$\begin{array}{l} \text{Breadth} \left\{ \begin{array}{l} 3.35 \\ 4.53 \\ 16.28 \end{array} \right. \text{Length} \left\{ \begin{array}{l} 15.32 \\ 16.42 \\ 72.52 \end{array} \right. \left\{ \begin{array}{l} 5 \text{ Acres a little more.} \\ 7 \text{ Acres } \frac{1}{2} \text{ almost.} \\ 118 \text{ Acres.} \end{array} \right. \end{array}$$

Note. *Gunter's Chain* containeth 4 *Statute Poles* in 100 *Links*, so that any number of *Chains* is no more than so many 100 *Links*; as 4 *Chains* is 400 *Links*, 6 *Chains* is 600 *Links*

Links, &c. and 160 square *Statute Poles* is an *Acre*, each *Pole* being 16 *Feet* and a half. Therefore in a square *Chain* is 16 square *Poles*. If you divide 160 (the square *Poles* in an *Acre*) by 16 (the square *Poles* in a *Chain*) the Quotient is 10, the square *Chains* in an *Acre*.

A *Square Chain* contains 10000 *Square Links* (for it is 100 multiplied by 100) and consequently an *Acre* is 100000 *Square Links*.

Therefore the Reason of the foregoing *Operation* is evident, for if you multiply 5730 *Links* by 1625 *Links*, the Product will be 9311250 *Square Links*. Divide 9311250 by 100000 (the *Square Links* in an *Acre*) the Quotient is *Acres*, and the Remainder is parts of an *Acre*: But to divide by 100000 is no more than to cut off five Figures to the Right-hand, so will the Remaining Figures to the Left-hand be *Acres*, and those cut off to the Right-hand 11250, are parts of an *Acre*: Again, multiply those five Figures cut off from the Right-hand of the Product, by 4, and from the Product cut off five Figures to the Right-hand, those on the Left-hand will be *Roods*, and if those cut off be multiplied by 40, and from the Product five Figures be cut off from the Right-hand, those on the Left-hand, are *Poles* or *Perches*.

So

So in the preceding Operation there is 93 Acres, no Roods, 18 Perches for the Content.

P R O B. III.

How to reduce Statute-Measure to Customary, and the Contrary.

According to a Statute made in the 33^d of Edward the I. and likewise in the 25th of Elizabeth, a Statute Pole is 16 Feet and $\frac{1}{2}$ long: Now divers parts of England uses a Pole of 18 Feet long, and some a Pole of 21 Feet long, and others a Pole of 24 Feet long. Therefore to turn one sort of Measure into another; suppose Statute into Customary, do thus; multiply any Number of Acres, Roods, and Perches, Statute-measure, by the square half Yards, or square half Feet, in a square Pole of Statute Measure, the Product divide by the square half Yards, or square half Feet in a Pole of the Customary-Measure, the Quotient gives you the Acres, Roods, and Perches of that Customary-Measure; as for Example. In 172 Acres Statute-Measure, how many Acres of 18 Feet to the Pole or Perch?

In a Statute Pole or Perch, there is 5 Yards and a half, that is 11 half Yards; consequently in a square Statute Pole there is 121 square half Yards, and in a square Pole of 18 Feet, there is 144 square half Yards,

172 Acres

144.

The
to
Ov
Di
pl
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ch
pr

172 Acres Statute Measure.

121 Square half Y. in a Statute Pole.

$$\begin{array}{r} 172 \\ \hline \end{array}$$

$$\begin{array}{r} 344 \\ \hline \end{array}$$

$$\begin{array}{r} 172 \\ \hline \end{array}$$

144)20812(144 Acres Customary and $\frac{76}{144}$.

$$\begin{array}{r} 144 \\ \hline \end{array}$$

$$\begin{array}{r} 0641 \\ \hline \end{array}$$

$$\begin{array}{r} 576 \\ \hline \end{array}$$

$$\begin{array}{r} 0652 \\ \hline \end{array}$$

$$\begin{array}{r} 576 \\ \hline \end{array}$$

076 Overplus.

Therefore the Customary Acres (at 18 feet to a Perch) is 144 $\frac{76}{144}$ of an Acre, the Overplus multiply by 4, and the Product Divide by 144 gives Roods; again, multiply the Remainder by 40 and the Product divide by 144, the Quotient will be Perches; as by the following Operation of the preceding Remainder.

76 Overplus, or Remainder.

$$\begin{array}{r} 4 \\ \hline \end{array}$$

$$\begin{array}{r} 144)304(2 \text{ Roods} \\ \hline \end{array}$$

$$\begin{array}{r} 288 \\ \hline \end{array}$$

$$\begin{array}{r} 016 \\ \hline \end{array}$$

$$\begin{array}{r} 40 \\ \hline \end{array}$$

$$\begin{array}{r} 144)640(4 \text{ Perches} \\ \hline \end{array}$$

$$\begin{array}{r} 576 \\ \hline \end{array}$$

$$\begin{array}{r} 064. \\ \hline \end{array}$$

So

So in the preceding Operation there is 93 Acres, no Roods, 18 Perches for the Content.

P R O B. III.

How to reduce Statute-Measure to Customary, and the Contrary.

ACCORDING to a Statute made in the 33^d of Edward the I. and likewise in the 25th of Elizabeth, a Statute Pole is 16 Feet and $\frac{1}{2}$ long: Now divers parts of England uses a Pole of 18 Feet long, and some a Pole of 21 Feet long, and others a Pole of 24 Feet long. Therefore to turn one sort of Measure into another; suppose Statute into Customary, do thus; multiply any Number of Acres, Roods, and Perches, Statute-measure, by the square half Yards, or square half Feet, in a square Pole of Statute Measure, the Product divide by the square half Yards, or square half Feet in a Pole of the Customary-Measure, the Quotient gives you the Acres, Roods, and Perches of that Customary-Measure; as for Example. In 172 Acres Statute-Measure, how many Acres of 18 Feet to the Pole or Perch?

In a Statute Pole or Perch, there is 5 Yards and a half, that is 11 half Yards; consequently in a square Statute Pole there is 121 square half Yards, and in a square Pole of 18 feet, there is 144 square half Yards,
172 Acres

172 Acres Statute Measure.

121 Square half Y. in a Statute Pole.

$$\begin{array}{r} 172 \\ \hline \end{array}$$

$$\begin{array}{r} 344 \\ \hline \end{array}$$

$$\begin{array}{r} 172 \\ \hline \end{array}$$

144)20812(144 Acres Customary and $\frac{76}{144}$.

$$\begin{array}{r} 144 \\ \hline \end{array}$$

$$\begin{array}{r} 0641 \\ \hline \end{array}$$

$$\begin{array}{r} 576 \\ \hline \end{array}$$

$$\begin{array}{r} 0652 \\ \hline \end{array}$$

$$\begin{array}{r} 576 \\ \hline \end{array}$$

076 Overplus.

Therefore the Customary Acres (at 18 feet to a Perch) is 144 $\frac{76}{144}$ of an Acre, the Overplus multiply by 4, and the Product Divide by 144 gives Roods; again, multiply the Remainder by 40 and the Product divide by 144, the Quotient will be Perches; as by the following Operation of the preceding Remainder.

76 Overplus, or Remainder.

$$\begin{array}{r} 4 \\ \hline \end{array}$$

$$\begin{array}{r} 144)304(2 \text{ Roods} \\ \hline \end{array}$$

$$\begin{array}{r} 288 \\ \hline \end{array}$$

$$\begin{array}{r} 016 \\ \hline \end{array}$$

$$\begin{array}{r} 40 \\ \hline \end{array}$$

$$\begin{array}{r} 144)640(4 \text{ Perches} \\ \hline \end{array}$$

$$\begin{array}{r} 576 \\ \hline \end{array}$$

$$\begin{array}{r} 064. \\ \hline \end{array}$$

So

So that 172 *Acres Statute-Measure* is 144 *Acres*, 2 *Roods* and 4 *Perches*, with a small Remainder (not worth taking notice) of *Customary-Measure*, of 18 *Feet* to the Pole or *Perch*.

If there had been any given *Roods* and *Perches* with the *Acres*, then you must turn all into *Perches*, and having multiplied and divided as before directed, divide the Quotient by 160, or 40, and that Quotient again by 4.

P R O B.

P R O B. IV. In 543 Customary Acres, at 18 Foot to the Perch, how many Acres of Statute Measure?

543 Customary Acres.

144 Square $\frac{1}{2}$ $\frac{1}{2}$ in a Customary Acre.

2172

2172

543

121)78192(646 Statute Acres.

726

0559

484

0752

726

26 Remainder multiplied

by ———4

104 no Roods

40

121)4160(34 Perches

263

0530

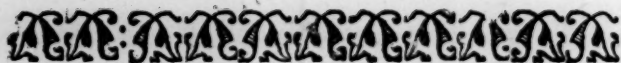
484

046 Remains.

Here you see that in 543 Customary Acres, at 18 Feet the Perch there are 646 Acres, no Roods, 34 Perches Statute-Measure and $\frac{46}{121}$.

Customary Acres as well as Statute Acres, contain 160 Square Perches, the bigness is only in the bigness of the Perch.

F I N I S



Note. This *Rule*, or any other, and all sorts of *Mathematical Instruments* are Sold at Reasonable Rates, at *Cherry Garden stairs*, on *Rotherhitb-Wall*, *London*.

By *JAMES ATKINSON*.

